Gunter, Jason

From: Nations, Mark [mnations@doerun.com]
Sent: Thursday, July 11, 2013 11:51 AM
To: Gunter, Jason
Cc: England, Jason; Yingling, Mark; Wohl, Matthew; robert.hinkson@dnr.mo.gov; Ty Morris (TMorris@barr.com)
Subject: Progress report
Attachments: RM 06-13.doc; SKMBT_C45413071018190.pdf; Teklab Lab Report 13061394_06-25-13.pdf

Jason,
Attached is the June 2013 Rivermines progress report. Please let me know if you have questions.
Mark

THE DOE RUN COMPANY

Remediation Group

Mark Nations
Mining Properties Manager
mnations@doerun.com

July 11, 2013

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
11201 Renner Blvd.
Lenexa, KS 66219

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period June 1, 2013 through June 30, 2013 is enclosed. If you have any questions or comments, please call me at 573-518-0800.

Sincerely,

Mark Nations
Mining Properties Manager

Enclosures
c: Jason England – TDRC
Mark Yingling – TDRC (electronic only)
Matt Wohl – TDRC (electronic only)
Robert Hinkson – MDNR
Ty Morris – Barr Engineering

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: June 1, 2013 – June 30, 2013

1. **Actions Performed and Problems Encountered This Period:**
   - Continued operating the roughing filter, ZVI filter, aeration tank, and final sand filter during the period.

   - Flow restrictions caused the roughing filter to overflow during the period. Due to influent plugging of the ZVI filter inlet or inlet pipe, additional head loss in the inlet pipe/structure caused the water level in the roughing filter (bio filter) to rise and overflow the pool sides.

   - Continued to take analytical samples from the pilot test three times a week. Samples were taken from the roughing filter (RMP-Rough), the aeration tank (RMP-Polish), and the final sand filter (RMP-Effluent).

   - Continued to take analytical samples from the seep pond effluent and the western treatment pond effluent to monitor the metals reduction of the treatment pond.

   - Additional head losses occurred in the 6-inch diameter pipes transferring water from the seep pond to the treatment cells. The head losses caused the seep pond to overflow and cause scouring around the seep pond manhole and on the seep pond berms.

   - Flow through the seepage ponds was measured at approximately 390 gallons per minute on June 25, 2013. This is significantly more than the 100 to 200 gallons per minute that is typically observed in the system. The increase in flow rate is expected to be a result of the heavy spring rains. The increase it flow rate is also believed to be a cause of increased head losses in the system.

   - A pipe cleaning contractor was hired to clear debris from the 6-inch diameter pipes transferring water from the seep pond to the treatment cells. Deceased animals and other debris were removed from the pipes. Flow between the seepage pond and the treatment cells were increased, and overflowing of the seepage pond was alleviated. Although head losses decreased, the observed head losses after the pipe cleaning were still observed to be greater than normally observed.

2. **Analytical Data and Results Received This Period:**
   - Dissolved zinc concentrations in the polishing filter effluent ranged between 0.003 mg/L and 0.012 mg/L during the period.
   - Total zinc concentrations in the polishing filter ranged between 0.113 mg/L and 0.910 mg/L during the period.
   - Total iron concentrations in the polishing filter ranged between 1.07 mg/L and 2.52 mg/L during the period.
   - Total suspended solids concentrations in the polishing filter effluent ranged between non-detect and 10.0 mg/L during the period.
   - During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.
   - During this period, the Ambient Air Monitoring Reports for February 2013 and March 2013 were completed. Any issues identified in these reports are discussed below. A copy of these documents has been sent to your attention.

     The February 2013 Ambient Air Monitoring Report noted the following:

   - The action levels for lead and dust were not exceeded.

- No samples were taken with the TSP monitors on 02/22/13 due to an ice storm.
- No samples were taken with the PM10 monitors on 02/24/13 due to an ice storm.

The March 2013 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No samples were taken with the TSP monitors on 03/07/13 due to the remediation crew being at annual training.

3. Developments Anticipated and Work Scheduled for Next Period:

- Continue analytical sampling and field measurements three times a week. No WET tests are planned.
- Continue to operate the renovated pilot test.
- Complete monthly water sampling activities as described in the Removal Action Work Plan.
- Complete air monitoring activities as described in the Removal Action Work Plan.
- Continue monitoring the western treatment pond to see that the hydraulics are working properly and evaluate the metals reduction as the pond continues to come online.
- Pending successful removal of the west pond obstructions, initial phases of cleanout of the old media in the east pond may begin.

4. Changes in Personnel:

- None.

5. Issues or Problems Arising This Period:

- None.

6. Resolution of Issues or Problems Arising This Period:

- None.

End of Monthly Progress Report

July 02, 2013

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001

RE: Rivermines NPDES **WorkOrder:** 13061394

Dear Allison Olds:

TEKLAB, INC received 4 samples on 6/26/2013 8:55:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Report Contents

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13061394
Report Date: 02-Jul-13

This reporting package includes the following:

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- X - Value exceeds Maximum Contaminant Level

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13061394
Report Date: 02-Jul-13

Cooler Receipt Temp: 1.8 °C

Locations and Accreditations

	Collinsville	Springfield	Kansas City	Collinsville Air
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	3920 Pintail Dr Springfield, IL 62711-9415	8421 Nieman Road Lenexa, KS 66214	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004	(217) 698-1004	(913) 541-1998	(618) 344-1004
Fax	(618) 344-1005	(217) 698-1005	(913) 541-1998	(618) 344-1005
Email	jhriley@teklabinc.com	KKlostermann@teklabinc.com	dthompson@teklabinc.com	EHurley@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2014	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2014	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2014	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2014	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2014	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		4/5/2014	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2013	Collinsville

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13
Lab ID: 13061394-001
Client Sample ID: RM-001
Matrix: AQUEOUS
Collection Date: 06/25/2013 12:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	500		**996**	mg/L	50	06/27/2013 1:49	R178855
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1		**7.34**		1	06/26/2013 22:32	R178846
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	06/26/2013 13:37	R178849
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	06/26/2013 13:40	R178841
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1		**1.2**	mg/L	1	06/28/2013 21:32	R178963
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2		**12.8**	µg/L	1	06/28/2013 20:41	89617
Zinc	NELAP	10		**19700**	µg/L	1	06/28/2013 20:41	89617
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2		**16.9**	µg/L	1	06/28/2013 18:16	89577
Zinc	NELAP	10		**21200**	µg/L	1	06/28/2013 18:16	89577
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2	X	**16.7**	µg/L	1	06/27/2013 11:14	89573
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**1140**	mg/L	1	07/01/2013 0:00	R178991
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2	X	**7.05**	µg/L	1	06/28/2013 9:12	89612

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13
Lab ID: 13061394-002
Client Sample ID: RM-US
Matrix: AQUEOUS
Collection Date: 06/25/2013 12:30

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**22**	mg/L	1	06/27/2013 2:10	R178855
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1		**8.21**		1	06/26/2013 21:38	R178846
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	06/26/2013 13:37	R178849
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1		**2**	mg/L	1	06/28/2013 21:38	R178963
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2		**< 2**	µg/L	1	06/28/2013 20:47	89617
Zinc	NELAP	10		**< 10**	µg/L	1	06/28/2013 20:47	89617
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2		**< 2**	µg/L	1	06/28/2013 18:22	89577
Zinc	NELAP	10		**< 10**	µg/L	1	06/28/2013 18:22	89577
MS QC limits for Mg are not applicable due to high sample/spike ratio.								
MS QC limits for Ca are not applicable due to high sample/spike ratio.								
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2		**2.3**	µg/L	1	06/27/2013 11:24	89573
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**209**	mg/L	1	07/01/2013 0:00	R178991
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2		**< 2**	µg/L	1	06/28/2013 9:29	89612

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13
Lab ID: 13061394-003
Client Sample ID: RM-DS
Matrix: AQUEOUS
Collection Date: 06/25/2013 13:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	100		**189**	mg/L	10	06/27/2013 2:29	R178855
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1		**8.01**		1	06/26/2013 21:40	R178846
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	06/26/2013 13:51	R178849
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1		**1.8**	mg/L	1	06/28/2013 21:44	R178963
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2		**< 2**	µg/L	1	06/28/2013 21:06	89617
Zinc	NELAP	10		**2090**	µg/L	1	06/28/2013 21:06	89617
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2		**< 2**	µg/L	1	06/28/2013 18:40	89577
Zinc	NELAP	10		**2170**	µg/L	1	06/28/2013 18:40	89577
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2	X	**5.85**	µg/L	1	06/27/2013 11:28	89573
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**359**	mg/L	1	07/01/2013 0:00	R178991
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2		**3.88**	µg/L	1	06/28/2013 9:33	89612

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13
Lab ID: 13061394-004
Client Sample ID: RM-DUP
Matrix: AQUEOUS
Collection Date: 06/25/2013 0:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**21**	mg/L	1	06/27/2013 17:55	R178902
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1		**8.14**		1	06/26/2013 21:41	R178846
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	06/26/2013 13:51	R178849
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1		**1.9**	mg/L	1	06/28/2013 21:51	R178963
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2		**< 2**	µg/L	1	06/28/2013 21:24	89617
Zinc	NELAP	10		**< 10**	µg/L	1	06/28/2013 21:24	89617
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2		**< 2**	µg/L	1	06/28/2013 18:58	89577
Zinc	NELAP	10		**< 10**	µg/L	1	06/28/2013 18:58	89577
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2		**2.22**	µg/L	1	06/27/2013 11:38	89573
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1		**209**	mg/L	1	07/01/2013 0:00	R178991
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2		**< 2**	µg/L	1	06/28/2013 9:36	89612

Sample Summary

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13061394
Report Date: 02-Jul-13

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
13061394-001	RM-001	Aqueous	5	06/25/2013 12:40
13061394-002	RM-US	Aqueous	5	06/25/2013 12:30
13061394-003	RM-DS	Aqueous	5	06/25/2013 13:20
13061394-004	RM-DUP	Aqueous	5	06/25/2013 0:00

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13061394
Report Date: 02-Jul-13

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
13061394-001A	RM-001	06/25/2013 12:40	06/26/2013 8:55		
	Standard Methods 2540 F				06/26/2013 13:40
13061394-001B	RM-001	06/25/2013 12:40	06/26/2013 8:55		
	EPA 600 375.2 Rev 2.0 1993 (Total)				06/27/2013 1:49
	Standard Method 4500-H B, Laboratory Analyzed				06/26/2013 22:32
	Standard Methods 2540 D				06/26/2013 13:37
13061394-001C	RM-001	06/25/2013 12:40	06/26/2013 8:55		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	06/28/2013 18:16
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	07/01/2013 11:35
	Standard Methods 3030 E, 3113 B, Metals by GFAA			06/26/2013 15:21	06/27/2013 11:14
	Standard Methods 2340 B, Hardness (Total)				07/01/2013 0:00
13061394-001D	RM-001	06/25/2013 12:40	06/26/2013 8:55		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			06/27/2013 12:46	06/28/2013 20:41
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			06/27/2013 11:39	06/28/2013 9:12
13061394-001E	RM-001	06/25/2013 12:40	06/26/2013 8:55		
	Standard Methods 5310 C, Organic Carbon				06/28/2013 21:32
13061394-002A	RM-US	06/25/2013 12:30	06/26/2013 8:55		
	Standard Method 4500-H B, Laboratory Analyzed				06/26/2013 21:38
	Standard Methods 2540 D				06/26/2013 13:37
13061394-002B	RM-US	06/25/2013 12:30	06/26/2013 8:55		
	EPA 600 375.2 Rev 2.0 1993 (Total)				06/27/2013 2:10
13061394-002C	RM-US	06/25/2013 12:30	06/26/2013 8:55		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	06/28/2013 18:22
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	07/01/2013 11:39
	Standard Methods 3030 E, 3113 B, Metals by GFAA			06/26/2013 15:21	06/27/2013 11:24
	Standard Methods 2340 B, Hardness (Total)				07/01/2013 0:00
13061394-002D	RM-US	06/25/2013 12:30	06/26/2013 8:55		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			06/27/2013 12:46	06/28/2013 20:47
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			06/27/2013 11:39	06/28/2013 9:29
13061394-002E	RM-US	06/25/2013 12:30	06/26/2013 8:55		
	Standard Methods 5310 C, Organic Carbon				06/28/2013 21:38
13061394-003A	RM-DS	06/25/2013 13:20	06/26/2013 8:55		
	Standard Method 4500-H B, Laboratory Analyzed				06/26/2013 21:40
	Standard Methods 2540 D				06/26/2013 13:51
13061394-003B	RM-DS	06/25/2013 13:20	06/26/2013 8:55		
	EPA 600 375.2 Rev 2.0 1993 (Total)				06/27/2013 2:29

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13061394
Report Date: 02-Jul-13

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
13061394-003C	RM-DS	06/25/2013 13:20	06/26/2013 8:55		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	06/28/2013 18:40
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	07/01/2013 11:50
	Standard Methods 3030 E, 3113 B, Metals by GFAA			06/26/2013 15:21	06/27/2013 11:28
	Standard Methods 2340 B, Hardness (Total)				07/01/2013 0:00
13061394-003D	RM-DS	06/25/2013 13:20	06/26/2013 8:55		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			06/27/2013 12:46	06/28/2013 21:06
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			06/27/2013 11:39	06/28/2013 9:33
13061394-003E	RM-DS	06/25/2013 13:20	06/26/2013 8:55		
	Standard Methods 5310 C, Organic Carbon				06/28/2013 21:44
13061394-004A	RM-DUP	06/25/2013 0:00	06/26/2013 8:55		
	Standard Method 4500-H B, Laboratory Analyzed				06/26/2013 21:41
	Standard Methods 2540 D				06/26/2013 13:51
13061394-004B	RM-DUP	06/25/2013 0:00	06/26/2013 8:55		
	EPA 600 375.2 Rev 2.0 1993 (Total)				06/27/2013 17:55
13061394-004C	RM-DUP	06/25/2013 0:00	06/26/2013 8:55		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	06/28/2013 18:58
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			06/26/2013 16:33	07/01/2013 11:53
	Standard Methods 3030 E, 3113 B, Metals by GFAA			06/26/2013 15:21	06/27/2013 11:38
	Standard Methods 2340 B, Hardness (Total)				07/01/2013 0:00
13061394-004D	RM-DUP	06/25/2013 0:00	06/26/2013 8:55		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			06/27/2013 12:46	06/28/2013 21:24
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			06/27/2013 11:39	06/28/2013 9:36
13061394-004E	RM-DUP	06/25/2013 0:00	06/26/2013 8:55		
	Standard Methods 5310 C, Organic Carbon				06/28/2013 21:51

Client: Barr Engineering Company

Client Project: Rivermines NPDES

Work Order: 13061394

Report Date: 02-Jul-13

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R178855 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						06/26/2013

Batch R178855 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**21**	20	0	104.2	90	110	06/26/2013

Batch R178855 **SampType:** MS Units **mg/L**
SampID: 13061394-001BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	500		**1470**	500	995.9	94.3	90	110	06/27/2013

Batch R178855 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 13061394-001BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	500		**1470**	500	995.9	95	1467	0.25	06/27/2013

Batch R178902 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						06/27/2013

Batch R178902 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	96.2	90	110	06/27/2013

STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch R178846 **SampType:** LCS Units
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH	1		**6.98**	7	0	99.7	99.1	100.8	06/26/2013

Batch R178846 **SampType:** DUP Units RPD Limit **10**
SampID: 13061394-001B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1		**7.36**				7.34	0.27	06/26/2013

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13

STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch R178846 **SampType:** DUP Units RPD Limit 10
SampID: 13061394-002A

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1		8.21				8.21	0.00	06/26/2013

Batch R178846 **SampType:** DUP Units RPD Limit 10
SampID: 13061394-003A

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1		8.05				8.01	0.50	06/26/2013

Batch R178846 **SampType:** DUP Units RPD Limit 10
SampID: 13061394-004A

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1		8.22				8.14	0.98	06/26/2013

STANDARD METHODS 2540 D

Batch R178849 **SampType:** MBLK Units mg/L
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		< 6						06/26/2013

Batch R178849 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		96	100	0	96	85	115	06/26/2013
Total Suspended Solids	6		100	100	0	100	85	115	06/26/2013
Total Suspended Solids	6		101	100	0	101	85	115	06/26/2013
Total Suspended Solids	6		101	100	0	101	85	115	06/26/2013

Batch R178849 **SampType:** DUP Units mg/L RPD Limit 15
SampID: 13061394-003A-DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Suspended Solids	6		< 6				0	0.00	06/26/2013

STANDARD METHODS 5310 C, ORGANIC CARBON

Batch R178963 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1		< 1						06/28/2013

Batch R178963 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	10		44.4	43.6	0	101.7	90	110	06/28/2013

Client: Barr Engineering Company

Client Project: Rivermines NPDES

Work Order: 13061394

Report Date: 02-Jul-13

STANDARD METHODS 5310 C, ORGANIC CARBON

Batch R178963 **SampType:** MS Units **mg/L**

SampID: 13061394-004EMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1		**6.8**	5	1.9	97.6	85	115	06/28/2013

Batch R178963 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 13061394-004EMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)	1		**6.8**	5	1.9	98.4	6.78	0.59	06/28/2013

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 89617 **SampType:** MBLK Units **µg/L**

SampID: MBLK-89617

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2		**< 2**	2	0	0	-100	100	06/28/2013
Zinc	10		**< 10**	10	0	0	-100	100	06/28/2013

Batch 89617 **SampType:** LCS Units **µg/L**

SampID: LCS-89617

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2		**45.1**	50	0	90.2	85	115	06/28/2013
Zinc	10		**451**	500	0	90.2	85	115	06/28/2013

Batch 89617 **SampType:** MS Units **µg/L**

SampID: 13061394-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2		**45.3**	50	0	90.6	75	125	06/28/2013
Zinc	10		**457**	500	2.8	90.9	75	125	06/28/2013

Batch 89617 **SampType:** MSD Units **µg/L** RPD Limit **20**

SampID: 13061394-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2		**46.2**	50	0	92.4	45.3	1.97	06/28/2013
Zinc	10		**463**	500	2.8	92.1	457	1.35	06/28/2013

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 89577 **SampType:** MBLK Units **µg/L**

SampID: MBLK-89577

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2		**< 2**	2	0	0	-100	100	06/28/2013
Calcium	50		**< 50**	50	0	0	-100	100	06/28/2013
Magnesium	10		**< 10**	10	0	0	-100	100	07/01/2013
Zinc	10		**< 10**	10	0	0	-100	100	06/28/2013
Zinc	10		**< 10**	10	0	0	-100	100	06/28/2013

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 89577 **SampType:** LCS Units µg/L
SampID: LCS-89577

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2		**50**	50	0	100	85	115	06/28/2013
Calcium	50		**1260**	1200	0	104.8	85	115	06/28/2013
Magnesium	10		**756**	750	0	100.7	85	115	07/01/2013
Zinc	10		**493**	500	0	98.6	85	115	06/28/2013
Zinc	10		**510**	500	0	102	85	115	06/28/2013

Batch 89577 **SampType:** MS Units µg/L
SampID: 13061394-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2		**49.8**	50	0	99.6	75	125	06/28/2013
Calcium	50	S	**44700**	1200	44200	41.7	75	125	06/28/2013
Magnesium	10	S	**24000**	750	23800	18.7	75	125	07/01/2013
Zinc	10		**497**	500	4.3	98.5	75	125	06/28/2013

Batch 89577 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 13061394-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2		**49.2**	50	0	98.4	49.8	1.21	06/28/2013
Calcium	50	S	**45000**	1200	44200	67.5	44700	0.69	06/28/2013
Magnesium	10	S	**23800**	750	23800	-1.3	24000	0.63	07/01/2013
Zinc	10		**490**	500	4.3	97.1	497	1.40	06/28/2013

STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch 89573 **SampType:** MBLK Units µg/L
SampID: MBLK-89573

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2		**< 2**	2	0	0	-100	100	06/27/2013

Batch 89573 **SampType:** LCS Units µg/L
SampID: LCS-89573

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2		**15**	15	0	100.1	85	115	06/27/2013

Batch 89573 **SampType:** MS Units µg/L
SampID: 13061394-001CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2		**30.2**	15	16.7	90.2	70	130	06/27/2013

Batch 89573 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 13061394-001CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2		**30.4**	15	16.7	91	30.2	0.41	06/27/2013

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13061394
Report Date: 02-Jul-13

STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 89612 **SampType:** MBLK Units µg/L
SampID: MBLK-89612

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2		**< 2**	2	0	0	-100	100	06/28/2013

Batch 89612 **SampType:** LCS Units µg/L
SampID: LCS-89612

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2		**13.6**	15	0	90.9	85	115	06/28/2013

Batch 89612 **SampType:** MS Units µg/L
SampID: 13061394-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2		**17.9**	15	7.05	72.6	70	130	06/28/2013

Batch 89612 **SampType:** MSD Units µg/L RPD Limit **20**
SampID: 13061394-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2		**17.7**	15	7.05	71.1	17.9	1.28	06/28/2013

Receiving Check List

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Barr Engineering Company
Work Order: 13061394
Client Project: Rivermines NPDES
Report Date: 02-Jul-13

Carrier: Tim Mathis
Received By: SRH

Completed by: Emily E. Pohlman
On: 26-Jun-13

Reviewed by: Michael L. Austin
On: 26-Jun-13

Pages to follow: Chain of custody [1] Extra pages included [0]

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp ℃	***1.8***
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☐	Lab ☑	NA ☐		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			

When thermal preservation is required, samples are compliant with a temperature between 0.1℃ - 6.0℃, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

13061394

BARR

Chain of Custody

1001 Diamond Ridge, Suite 1100
Jefferson City, MO 65109
(573) 638-5000

Teklab, Inc.
Courier Pick Up

COC 1 of 1

Project Manager: Ty Morris

Project QC Contact: Andrea Nord

Sampled By: Stephen Moilanen

Laboratory: Teklab

Project Number: 25860009.00 TLM 021

Project Name: Rivermines NPDES

Sample Origination State: MO (use two letter postal state abbreviation)

COC Number: RMP 062513

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix: Water	Matrix: Soil	Matrix	Type: Grab	Type: Comp	Type: QC	Water: pH	Water: Total Suspended Solids	Water: Sulfate	Water: Settleable Solids	Water: Total Organic Carbon	Water: Total Metals	Water: Dissolved Metals	Water: Hardness	Water	Water	Soil: VOCs (tared MeOH) #1	Soil: GRO, BTE (tared MeOH) #1	Soil: DRO (tared unpreserved)	Soil: Metals (unpreserved)	Soil: SVOCs (unpreserved) #2	Soil: % Solids (plastic vial, unpres.)	Soil	Soil	Total Number of Containers	
1. RM-001 13061394 -001				06/25/13	12:40	X			X			X	X	X	X	X	X	X	X											5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
2. RM-US -002				06/25/13	12:30	X			X			X	X	X		X	X	X	X											5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
3. RM-DS -003				06/25/13	13:20	X			X			X	X	X		X	X	X	X											5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
4. RM-DUP -004				06/25/13	--:--	X			X			X	X	X		X	X	X	X											5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
5.																															
6.																															
7.																															
8.																															

Comments: Invoice to Mark Nations at Doe Run. Results to be sent to Allison Olds (aolds@barr.com) at Barr Engineering, Andrea Nord (anord@barr.com) at Barr Engineering, and Mark Nations (mnations@doerun.com) at Doe Run.
Matrix is surface water.
Metals include Cadmium, Lead, and Zinc.

Common Parameter/Container – Preservation Key

#1 – Volatile Organics = BTEX, GRO, TPH, 8260 Full List

#2 – Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide, PCBs

#3 – General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate

#4 – Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By	On Ice?	Date	Time	Received by	Date	Time
Stephen Moilanen [signature]	☒Y ☐N	6/25/13	14:30	[signature]	6/26/13	0700
[signature]	☐Y ☐N	6-26-13	0855	Stephanie Haynes	6/26/13	8:55

Samples Shipped VIA: ☐Air Freight ☐Federal Express ☐Sampler ☒Other: Courier

1.8°c, ice

Air Bill Number:

10185 ✓ [initials] 6/26/13

Distribution: White – Original Accompanies Shipment to Lab; Yellow – Field Copy; Pink – Lab Coordinator

(3)

C:\Users\sbm\Desktop\Doe Run Chains\Chain of Custody RM Permit.doc